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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/629,742	07/30/2003	Alfred I-Tsung Pan	200206676-1	8919

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EXAMINER	
LAMBELET, LAWRENCE EMILE	
ART UNIT	**PAPER NUMBER**
1732	

DATE MAILED: 06/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/629,742	PAN ET AL.	
	Examiner	Art Unit	
	Lawrence Lambelet	1732	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 July 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

4a) Of the above claim(s) *18-20 and 26-30* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17 and 21-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-17 and 21-25, drawn to stereolithographic method of forming three-dimensional structure, classified in class 264, subclass 401.

II. Claims 18-20 and 26-30, drawn to apparatus for forming three-dimensional structure, classified in class 425, subclass 174.4.

Inventions of Groups I and II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another and materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case, the process as claimed can be practiced by another and materially different apparatus wherein the work piece is lowered rather than the viscous liquid level raised.

Because these inventions are independent or distinct for the reasons given above and have acquired a separate status in the art in view of their different classification, restriction for examination purposes as indicated is proper.

During a telephone conversation with W. Bradley Haymond on 05/22/2006 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-17 and 21-25. Affirmation of this election must be made by applicant in replying to this Office action. Claims 18-20 and 26-30 are withdrawn from further

consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is advised that the reply to this requirement to be complete must include (i) an election of a species or invention to be examined even though the requirement be traversed (37 CFR 1.143) and (ii) identification of the claims encompassing the elected invention.

The election of an invention or species may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an election without traverse.

Should applicant traverse on the ground that the inventions or species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the inventions or species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C.103(a) of the other invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims1, 14, 21, and 25 are rejected under 35 U.S.C. 102(e) as being anticipated by Ederer et al (U.S. Patent 6,838,035).

Ederer et al, hereafter "Ederer", discloses a rapid prototyping method as recited in claim 1. Applicant should refer to the whole document with particular attention to the passages detailed in context below.

Ederer teaches a method of forming a three-dimensional structure through compounding multiple layers wherein liquid drops are selectively deposited to become solidified and surrounded with a second liquid. The second liquid is maintained at a level substantially at the top of the deposited layer and is sufficiently dense, and therefore viscous, as to perform a support function for the structure. This disclosure is found in claim 1 of the reference and at lines 45-65 in column 2 and lines 15-25 in column 4. Ederer further teaches a control for maintaining the level at lines 55-63 in column 7.

Ederer teaches a method of forming a three-dimensional object by ejecting drops from a program-controlled drop-on-demand application device with planar functionality, as required by claim 21. This is shown in Fig 3 of the reference and disclosed at lines

28-35 in column 7. This device is used in the system discussed above for claim 1, wherein a viscous liquid is supplied and raised to meet the level of each new layer.

Ederer teaches the method of claim 1, as discussed above, and further teaches that the viscous liquid can "wet" the top surface thereby providing a formation surface for the next layer of deposition, as required by claim 14, at lines 8-21 in column 3. Ederer further teaches that the viscous liquid provides support for over-extending structure at lines 24-35 in column 5.

Ederer teaches the method of claim 21, as discussed above, and further teaches high viscosity at room temperature and non-detrimental reactivity of the second liquid, as required by claim 25. This teaching appears at lines 54-67 in column 2 and lines 1-3 in column 3. Ederer describes the second liquid has having a comparable density to the solid form of the first liquid. A liquid which would give buoyancy to a solid would be thought of as having high viscosity. Ederer also describes the second liquid as being effective as a separation agent. Such an agent, having the functionality of preventing bonding between layers, would be devoid of reactivity with the first liquid.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 2, 4, 8-10, 12, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ederer, as applied to claims 1, 14, 21 and 25 above, and further in view of Jang et al (U.S. Patent 6,405,095).

Ederer teaches the method of claims 1, 14, 21, and 25, as discussed above.

Ederer does not teach deposition of first and second different materials, as required by claim 2.

Jang et al, hereafter "Jang", does teach droplet deposition of multiple materials in selective zones of a layer at lines 11-20 in column 6 and lines 19-28 in column 7.

Ederer and Jang are combinable because they are concerned with a similar technical field, namely, rapid prototyping. One of ordinary skill in the art at the time of the invention would have found it obvious to include in the method of Ederer the combination of different materials taught by Jang, and would have been motivated to do so to obtain coloration effects.

Ederer does not teach a second material to define an external surface, as required by claim 4, or to form a predetermined portion, as required by claim 22.

Jang does teach forming an outer boundary with one material thereby to define an interior space to be filled with a second material at lines 53-67 in column 19 and lines 1-10 in column 20. The fill material of the reference is deposited as a powder and is transformed by a local heat source to a molten state before solidifying. The switch of a powder deposition, which subsequently undergoes a phase change, for a liquid droplet deposition would have been obvious as a matter of choice for someone skilled in the art.

One of ordinary skill in the art at the time of the invention would have found it obvious to include in the method of Ederer the boundary formation as taught by Jang, and would have been motivated to do so in order to provide a finished surface for the structure.

Ederer does not teach using a UV setting resin for a first material, as required by claims 8 and 9. Ederer further does not teach using either a thermoplastic resin, as required by claim 10, or a metal, as required by claim 12, for a second material.

Jange does teach use of UV setting resins, thermoplastic resins and metals for liquid deposition materials at lines 55-61 in column 13 and lines 15-25 in column 14. The combination of UV with thermoplastic, or UV with metal, as first and second materials would have been obvious as a matter of choice for one skilled in the art.

An irradiation source is shown in Fig 1 at symbol 19. Choosing the timing for irradiating the UV resin, such as after the landing of each drop, would also have been obvious as a matter of choice for one skilled in the art.

One of ordinary skill in the art at the time of the invention would have found it obvious to include in the method of Ederer the use of a thermosetting resin in combination with another resin or metal, as taught by Jang, and would have been motivated to do so to create a cross-linked structure that would not be affected by environmental heating.

Claims 3, 5-7, 11, 13, and 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Erderer in view of Jang as applied to claims 1-2, 4, 8-10, 12, 14, 21-22 and 25 above, and further in view of Prinz et al (U.S. Patent 5,301,415).

Ederer, in combination with Jang, teaches the method of claims 1-2, 4, 8-10, 12, 14, 21-22, and 25 as discussed above.

Ederer does not teach a second material with a different melting point, as required by claim 3, and does not teach a second material with a lower melting point, as required by claim 5.

Prinz et al, hereafter "Prinz", does teach a second liquid deposition material with a lower melting point at lines 7-15 in column 3 and lines 18-24 in column 4.

Ederer, Jang and Prinz are combinable because they are concerned with a similar technical field, namely, rapid prototyping. One of ordinary skill in the art at the time of the invention would have found it obvious to include in the method of Ederer the disparate melting points taught by Prinz, and would have been motivated to do so to easily separate system components.

Ederer does not teach heating to cause a second deposition material to flow into voids of the first material, as required by claims 6, 11, 13, and 23; and does not teach sufficient heating to alloy the materials, as required by claims 7 and 24.

Jang does teach heating a second deposition material to a molten state at lines 11-36 in column 6. It would be obvious to one skilled in the art that a molten material formed in contact with a first material having interstices spaces resulting from liquid drop deposition would flow by capillary action into those spaces. It would be further obvious that sufficiently increased heat would bring about molecular diffusion resulting in alloy formation. Official notice is hereby taken of capillary action and diffusion gradients as common knowledge processes in the art.

One of ordinary skill in the art at the time of the invention would have found it obvious to include in the method of Ederer the infusion of materials as taught by Jang and would have been motivated to do so to densify, and consequently strengthen, the structure.

Claims 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ederer as applied to claims 1, 14, 21, and 25 above, and further in view of Fink et al (U.S. Patent 5,510,066).

Ederer teaches the method of claims 1, 14, 21, and 25, as discussed above.

Ederer does not teach the viscous liquid entering the voids formed between the drops of the deposit liquid, as required by claim 15. Ederer also does not teach removing excess material, as required by claim 16, and further does not teach a stimulus to induce a change in the material, as required by claim 17.

Fink et al, hereafter "Fink", does teach a viscous liquid occupying voids formed by a first material. This is shown in the reference in Fig's 3 and 4 and further disclosed at lines 15-40 in column 3. Reference is made to viscosity enhancement at lines 45-48 in column 3. The removal of excess liquid is taught at lines 55-60 in column in column 3. A heat source providing a stimulus for a reaction is disclosed at 35-40 in column 6.

Ederer and Fink are combinable because they are concerned with a similar technical field, namely, rapid prototyping. One of ordinary skill in the art at the time of the invention would have found it obvious to include in the method of Ederer the impregnation of material, as taught by Fink, and would have been motivated to do so to in order to provide a smooth exterior surface to the structure.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following documents are cited to further show the state of the art with regard to forming three-dimensional structures through deposition layering:

U.S. Patent 6,942,830 to Mülhaupt et al

U.S. Patent 6,193,922 to Ederer

U.S. Patent 6,309,711 to Tseng et al

U.S. Patent 5,695,708 to Karp et al

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lawrence Lambelet whose telephone number is 571-272-1713. The examiner can normally be reached on 8 am-4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson can be reached on 571-272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LEL

CHRISTINA JOHNSON
PRIMARY EXAMINER
6/14/06